WHAT IS CLAIMED IS:

1. A method of making a polymer nanocomposite comprising:

combining a polymer dispersion with a clay mineral dispersion to form a clay-polymer dispersion;

adding a flocculating agent to the clay-polymer dispersion mixture to form the polymer nanocomposite.

2. The method of claim 1, further comprising forming a polymer dispersion by adding a polymer to a liquid carrier.

3. The method of claim 1, further comprising forming a clay mineral dispersion by adding a clay mineral to a liquid carrier.

4. The method of claim 1, wherein the polymer dispersion comprises a latex.

5. The method of claim 1, wherein the polymer dispersion comprises a styrene-butadiene.

6. The method of claim 1 wherein the polymer dispersion comprises a polyurethane dispersion.

7. The method of claim 1 wherein the polymer dispersion comprises polyvinyl chloride, an acrylic rubber, a butyl-containing polymer, a chlorosulfonated polyethylene rubber, a fluoroelastomer, or a polyisoprene.

8. The method of claim 1 wherein the polymer dispersion comprises a negatively charged polymer and wherein the flocculating agent comprises a positively

charged compound.

9. The method of claim 1 wherein the polymer dispersion comprises a positively charged polymer and wherein the flocculating agent comprises a negatively charged compound.

10. The method of claim 1, wherein the polymer dispersion comprises a polymer and a surfactant dispersed in a liquid carrier.

11. The method of claim 1, wherein the polymer dispersion comprises up to about 80% by weight of the polymer.

12. The method of claim 1, further comprising forming the polymer dispersion by subjecting a mixture of the polymer in the first liquid carrier to a shearing process.

13. The method of claim 1, wherein the clay mineral dispersion comprises montmorillonite.

14. The method of claim 1, wherein the clay mineral dispersion comprises bentonite.

15. The method of claim 1, wherein the clay mineral dispersion comprises hectorite, saponite, attapulgite, beidelite, stevensite, sauconite, nontronite, Laponite, or sepiolite.

16. The method of claim 1, wherein the clay mineral dispersion comprises hydrotalcite.

17. The method of claim 1, wherein the clay mineral dispersion comprises between about 1 to about 10% by weight of the clay mineral.

18. The method of claim 1, further comprising forming the clay dispersion by subjecting a mixture of the clay mineral in the second liquid carrier to a high shear process.

19. The method of claim 1, wherein the clay-polymer dispersion comprises up to about 90% by weight of clay mineral with respect to the weight of polymer in the clay-polymer dispersion.

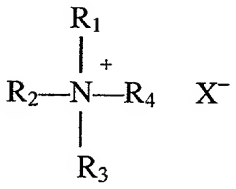
20. The method of claim 1, wherein the clay-polymer dispersion comprises up to about 30% by weight of clay mineral with respect to the weight of polymer in the clay-polymer dispersion.

21. The method of claim 1, wherein the clay-polymer dispersion comprises up to about 10% by weight of clay mineral with respect to the weight of polymer in the clay-polymer dispersion.

22. The method of claim 1 wherein the flocculating agent comprises an organic salt.

23. The method of claim 1 wherein the flocculating agent comprises a quaternary ammonium compound.

24. The method of claim 1 wherein the flocculating agent comprises a quaternary ammonium compound having the structure:



wherein R_1, R_2, R_3, and R_4 are independently alkyl groups, aryl groups or arylalkyl groups, and wherein at least one of R_1, R_2, R_3, or R_4 is an aliphatic group

derived from a naturally occurring oil.

25. The method of claim 1 wherein the flocculating agent comprises an inorganic salt.

26. The method of claim 1 wherein the flocculating agent comprises a Group I metal salt.

27. The method of claim 1 wherein the flocculating agent comprises a Group II metal salt.

28. The method of claim 1 wherein the flocculating agent comprises a mineral compound.

29. The method of claim 1, wherein the flocculating agent comprises between about 1% to about 10% by weight of the clay-polymer dispersion.

30. A polymer nanocomposite prepared by the method comprising:

combining a polymer dispersion with a clay mineral dispersion to form a clay-polymer dispersion;

adding a flocculating agent to the clay-polymer dispersion mixture to form the polymer nanocomposite.

31. The polymer nanocomposite of claim 30, wherein the method further comprises forming a polymer dispersion by adding a polymer to a liquid carrier.

32. The polymer nanocomposite of claim 30, wherein the method further comprises forming a clay mineral dispersion by adding a clay mineral to a liquid carrier.

33. The polymer nanocomposite of claim 30, wherein the polymer dispersion comprises a latex.

34. The polymer nanocomposite of claim 30, wherein the polymer dispersion comprises a styrene-butadiene.

35. The polymer nanocomposite of claim 30, wherein the polymer dispersion comprises a polyurethane dispersion.

36. The polymer nanocomposite of claim 30, wherein the polymer dispersion comprises polyvinyl chloride, an acrylic rubber, a butyl-containing polymer, a chlorosulfonated polyethylene rubber, a fluoroelastomer, or a polyisoprene.

37. The polymer nanocomposite of claim 30, wherein the polymer dispersion comprises a negatively charged polymer and wherein the flocculating agent comprises a positively charged compound.

38. The polymer nanocomposite of claim 30 wherein the polymer dispersion comprises a positively charged polymer and wherein the flocculating agent comprises a negatively charged compound.

39. The polymer nanocomposite of claim 30, wherein the polymer dispersion comprises a polymer and a surfactant dispersed in a liquid carrier.

40. The polymer nanocomposite of claim 30, wherein the polymer dispersion comprises up to about 80% by weight of the polymer.

41. The polymer nanocomposite of claim 30, wherein the method further comprises forming the polymer dispersion by subjecting a mixture of the polymer in the first liquid carrier to a shearing process.

42. The polymer nanocomposite of claim 30, wherein the clay mineral comprises montmorillonite.

43. The polymer nanocomposite of claim 30, wherein the clay mineral comprises bentonite.

44. The polymer nanocomposite of claim 30, wherein the clay mineral comprises hectorite, saponite, attapulgite, beidelite, stevensite, sauconite, nontronite, Laponite, or sepiolite.

45. The polymer nanocomposite of claim 30, wherein the clay mineral comprises hydrotalcite.

46. The polymer nanocomposite of claim 30, wherein the clay mineral dispersion comprises between about 1 to about 10% by weight of the clay mineral.

47. The polymer nanocomposite of claim 30, wherein the method further comprises forming the clay dispersion by subjecting a mixture of the clay mineral in the second liquid carrier to a high shear process.

48. The polymer nanocomposite of claim 30, wherein the clay-polymer dispersion comprises up to about 90% by weight of clay mineral with respect to the weight of polymer in the clay-polymer dispersion.

49. The polymer nanocomposite of claim 30, wherein the clay-polymer dispersion comprises up to about 30% by weight of clay mineral with respect to the weight of polymer in the clay-polymer dispersion.

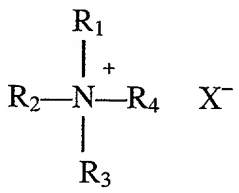
50. The polymer nanocomposite of claim 30, wherein the clay-polymer dispersion

comprises up to about 10% by weight of clay mineral with respect to the weight of polymer in the clay-polymer dispersion.

51. The polymer nanocomposite of claim 30, wherein the flocculating agent comprises an organic salt.

52. The polymer nanocomposite of claim 30, wherein the flocculating agent comprises a quaternary ammonium compound.

53. The polymer nanocomposite of claim 30, wherein the flocculating agent comprises a quaternary ammonium compound having the structure:



wherein R_1, R_2, R_3, and R_4 are independently alkyl groups, aryl groups or arylalkyl groups, and wherein at least one of R_1, R_2, R_3, or R_4 is an aliphatic group derived from a naturally occurring oil.

54. The polymer nanocomposite of claim 30, wherein the flocculating agent comprises an inorganic salt.

55. The polymer nanocomposite of claim 30, wherein the flocculating agent comprises a Group I metal salt.

56. The polymer nanocomposite of claim 30, wherein the flocculating agent comprises a Group II metal salt.

57. The polymer nanocomposite of claim 30, wherein the flocculating agent

comprises a mineral compound.

58. The polymer nanocomposite of claim 30, wherein the flocculating agent comprises between about 1% to about 10% by weight of the clay-polymer dispersion.

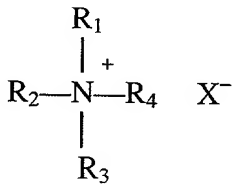
59. A method of making a polymer nanocomposite comprising:

forming a clay mineral dispersion by adding a clay mineral and an onium compound to a liquid carrier, wherein the onium compound is present in excess of the cation exchange capacity of the clay mineral such that a portion of the onium compound present is not bound to the clay mineral;

combining a polymer dispersion with the clay mineral dispersion to form the polymer nanocomposite.

60. The method of claim 59, wherein the onium compound comprises a quaternary ammonium compound.

61. The method of claim 59 wherein the onium compound comprises a quaternary ammonium compound having the structure:



wherein R_1, R_2, R_3, and R_4 are independently alkyl groups, aryl groups or arylalkyl groups, and wherein at least one of R_1, R_2, R_3, or R_4 is an aliphatic group derived from a naturally occurring oil.

62. The method of claim 59, wherein the amount of onium compound is up to about 3 times the cation exchange capacity of the clay mineral.

63. The method of claim 59, further comprising forming a polymer dispersion by adding a polymer to a liquid carrier.

64. The method of claim 59, wherein the polymer dispersion comprises a latex.

65. The method of claim 59, wherein the polymer dispersion comprises a styrene-butadiene.

66. The method of claim 59 wherein the polymer dispersion comprises a polyurethane dispersion.

67. The method of claim 59 wherein the polymer dispersion comprises polyvinyl chloride, an acrylic rubber, a butyl-containing polymer, a chlorosulfonated polyethylene rubber, a fluoroelastomer, or a polyisoprene.

68. The method of claim 59, wherein the polymer dispersion comprises a polymer and a surfactant dispersed in a liquid carrier.

69. The method of claim 59, wherein the polymer dispersion comprises up to about 80% by weight of the polymer.

70. The method of claim 59, further comprising forming the polymer dispersion by subjecting a mixture of the polymer in the first liquid carrier to a shearing process.

71. The method of claim 59, wherein the clay mineral comprises montmorillonite.

72. The method of claim 59, wherein the clay mineral comprises bentonite.

73. The method of claim 59, wherein the clay mineral comprises hectorite, saponite, attapulgite, beidelite, stevensite, sauconite, nontronite, Laponite, or sepiolite.

74. The method of claim 59, wherein the mineral clay comprises hydrotalcite.

75. The method of claim 59, wherein the clay mineral dispersion comprises between about 1 to about 10% by weight of the clay mineral.

76. The method of claim 59, wherein forming a clay dispersion comprises subjecting a mixture of the clay mineral in the liquid carrier to a high shear process.

77. The method of claim 59, wherein the clay-polymer dispersion comprises up to about 90% by weight of clay mineral with respect to the weight of polymer in the clay-polymer dispersion.

78. The method of claim 59, wherein the clay-polymer dispersion comprises up to about 30% by weight of clay mineral with respect to the weight of polymer in the clay-polymer dispersion.

79. The method of claim 59, wherein the clay-polymer dispersion comprises up to about 10% by weight of clay mineral with respect to the weight of polymer in the clay-polymer dispersion.

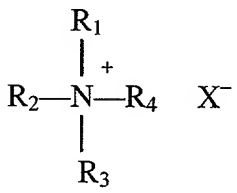
80. A polymer nanocomposite prepared by the method comprising:

forming a clay mineral dispersion by adding a clay mineral and an onium compound to a liquid carrier, wherein the onium compound is present in excess of the cation exchange capacity of the clay mineral such that a portion of the onium compound present is not bound to the clay mineral;

combining the polymer dispersion with the clay mineral dispersion to form the polymer nanocomposite.

81. The polymer nanocomposite of claim 80, wherein the onium compound comprises a quaternary ammonium compound.

82. The polymer nanocomposite of claim 80, wherein the onium compound comprises a quaternary ammonium compound having the structure:



wherein R_1, R_2, R_3, and R_4 are independently alkyl groups, aryl groups or arylalkyl groups, and wherein at least one of R_1, R_2, R_3, or R_4 is an aliphatic group derived from a naturally occurring oil.

83. The polymer nanocomposite of claim 80, wherein the amount of onium compound is up to about 3 times the cation exchange capacity of the clay mineral.

84. The polymer nanocomposite of claim 80, wherein the method further comprises forming a polymer dispersion by adding a polymer to a liquid carrier.

85. The polymer nanocomposite of claim 80, wherein the polymer dispersion comprises a latex.

86. The polymer nanocomposite of claim 80, wherein the polymer dispersion comprises a styrene-butadiene.

87. The polymer nanocomposite of claim 80, wherein the polymer dispersion comprises a polyurethane dispersion.

88. The polymer nanocomposite of claim 80, wherein the polymer dispersion comprises polyvinyl chloride, an acrylic rubber, a butyl-containing polymer, a chlorosulfonated polyethylene rubber, a fluoroelastomer, or a polyisoprene.

89. The polymer nanocomposite of claim 80, wherein the polymer dispersion comprises a polymer and a surfactant dispersed in a liquid carrier.

90. The polymer nanocomposite of claim 80, wherein the polymer dispersion comprises up to about 80% by weight of the polymer.

91. The polymer nanocomposite of claim 80, wherein the method further comprises forming the polymer dispersion by subjecting a mixture of the polymer in a liquid carrier to a shearing process.

92. The polymer nanocomposite of claim 80, wherein the clay mineral comprises montmorillonite.

93. The polymer nanocomposite of claim 80, wherein the clay mineral comprises bentonite.

94. The polymer nanocomposite of claim 80, wherein the clay mineral comprises hectorite, saponite, attapulgite, beidelite, stevensite, sauconite, nontronite, Laponite, or sepiolite.

95. The polymer nanocompite of claim 80, wherein the clay mineral comprises hydrotalcite.

96. The polymer nanocomposite of claim 80, wherein the clay mineral dispersion comprises between about 1 to about 10% by weight of the clay mineral.

97. The polymer nanocomposite of claim 80, wherein the method further comprises forming a clay dispersion by subjecting a mixture of the clay mineral in the second liquid carrier to a high shear process.

98. The polymer nanocomposite of claim 80, wherein the clay-polymer dispersion comprises up to about 90% by weight of clay mineral with respect to the weight of polymer in the clay-polymer dispersion.

99. The polymer nanocomposite of claim 80, wherein the clay-polymer dispersion comprises up to about 30% by weight of clay mineral with respect to the weight of polymer in the clay-polymer dispersion.

100. The polymer nanocomposite of claim 80, wherein the clay-polymer dispersion comprises up to about 10% by weight of clay mineral with respect to the weight of polymer in the clay-polymer dispersion.